Long-Run Economic Perspectives of an Ageing Society

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María Dolores Guilló
Alex Pérez-Laborda
Fidel Perez-Sebastian

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Immigration, the evolution of skills, and social security*

María Dolores Guilló
University of Alicante
guillo@ua.es

Alex Pérez-Laborda
University of Alicante
alex@merlin.fae.ua.es

Fidel Perez-Sebastian
University of Alicante
fidel.perez@ua.es

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Abstract

Migration is sometimes seen as a panacea to circumvent the financial problems associated to ageing societies. Other authors, however, see it as a burden, because the arrival of migrant workers can depress the wage of non-educated natives and reduce the economy's average productivity. In this paper, we analyze the effect of migration on workers' productivity and the wage gap. We construct a life-cycle model with endogenous educational choices and health investment. Our results point out that, when human capital investment over the life cycle is possible, migration does not universally increase the wage gap, this depends on the economy's initial conditions.

JEL Classification: E24, E61
Key words: aging, migration, wage gap, pension system

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1 Introduction

The challenges faced by the European economies will grow over the next decades as improvements in human longevity contribute to a significant increase in the proportion of aged population. According to Eurostat projections, the EU27 population is projected to continue to grow older, with the share of the population aged 65 years and over rising from a 17.1% in 2008 to 30.0% in 2060 (Table 1). Moreover, the share of the population belonging to the oldest groups is also projected to increase considerably; those aged 80 and over are expected to rise from 4.4% to 12.1% over the same period.

One of the main implications of this aging process is the negative effect that the increase of dependency ratios has on the viability of the current pay-as-you-go pension systems (that is, wether the programs begin to pay out more than are bringing in).[1] In fact, the effect of ageing on pensions has been, and will continue to be, a subject of intense academic research. There is a consensus in the literature that the demographic transition will make the current pensions systems of most European countries unsustainable in the long-term. This fact has recently lead to the introduction of social security system reforms, mostly by delaying the (standard) retirement age.

Together with the ageing process, immigration flows towards European countries have been also increasing in recent decades. As longevity increases and fertility remains steady below replacement rates, positive net migration has become the only population growth factor in many EU countries. Consequently, migration has been lately regarded as positive by governments: the entry of young and middle age immigrant would increase working population which may help to mitigate the European problems associated to an ageing society.

Nevertheless, the net contribution of migration may be quite modest (Borjas (1995), Feldstein (2006)). First, the average productivity of a migrant is lower than the native as a consequence of less years of education on average, because of non

[1] In addition, public pension schemes are severely affected by the current financial and economic crisis. Under proportional and progressive scheemes, high unemployment and lower earnings is reducing the contribution to pensions systems exacerbating the problem due to aging.

recognized educational credentials or just due to cultural distance. As the average immigrant has lower salary, the contributions she makes are less than those of an average native, especially under very progressive tax systems (as in EU). Second, migrants are also consumers of government benefits (especially health and education). Evidence of the US suggests that the immigrants are greater consumer of public assistance, since the immigrant household is greater and poorest on average than the native one, what makes them eligible for social benefits (Borjas and Hinton (1996)).

Even more important, is that migration may only be a temporary solution, since the immigrant population would also become old and would eventually become beneficiary of the system as well[2] Storesletten (2000) calibrates an OLG model for the US economy and concludes that the effect of immigrants in sustaining social security varies with their age (and skills). According to his predictions, migration has a positive effect only if migration policy is directed to middle aged high skilled immigrants.

This is in contrast with the prior views of Smith and Edmonston (1996) and Lee and Miller (2000) who find that positive effects for the economy are higher if immigrants are younger. For the case of Europe, employing generational accounting methods Bonin et al. (2000) and Collado et al. (2004), find that increasing the number of immigrants reduce the financial burden for future natives in Germany and Spain, respectively. Recently, Gonzalez et al. (2009) also make use of an OLG model. In their study, they use demographic and immigration projections from the Instituto Nacional de Estadística (INE) to understand the impact of immigration on the Spanish pension system. They also simulate the full labor history of different workers (differing by age, gender, skill and nationality). Their findings show that (with current projections) immigration will not suffice to balance the Spanish pension system even under complete assimilation of immigrants (in terms of their revenues and contributions to social security). They may provide, however, additional time to undertake the necessary reforms.

Besides their roll as tax-payers, immigrants also have changed labor markets. Since migration represents an increasing share of the labor force, the mix of skills,

[2] Although some may return to their country of origin before elegibility for social security benefits.

education and productivity in the economy is increasingly determined by the skills, education and productivity of the foreign born population. A very large amount of the literature has focused in analyzing the impact of immigrants on the wages of natives.[3] Immigration will affect the wage inequality among natives if the skill distribution of immigrants differs from that of natives. The basic argument here is that since the average immigrant is less skilled than the native, migration would reduce a country's average productivity and also – in a standard text-book model – reduce the wages of the unskilled native workers (or in economies subject to rigidities, as in Europe, an increase the unskilled unemployment).

Although there is some empirical evidence that this is the case for the US (Borjas (2003), empirical studies for Europe show little or null evidence of any impact of migration on wages[4]. Among of the possible explanations of this fact, it has been argued that immigrant and native workers are not perfect substitutes, so that an increase of immigrant workers do not have to depress the wages of the native (Octaviano and Peri (2008)). Together with the wage premium, migration may also impact the accumulation of human capital. Since incentives to complete education are influenced by the wage structure, immigration may increase the price of human capital and, in particular, natives' high school educational attainment (Betts 1998, Hunt 2011).

Since the benefit from migration for the receiving (aged) economy depends on the impact of migration on country's productivity, we believe that it is essential to understand jointly the roll of migration on both the labor market and human capital formation. Previous literature has mainly ignored the impact of migration on the incentives to acquire skills.[5] Although the assumptions of variable wages but fixed skill premium (Storesletten (2000)) introduce a link between migration and labor market outcomes (might well increase interest rates and decrease wages, due to the

[3] See for instance the surveys of Borjas (1994), (1999) Friedberg and Hunt (1995) or Card (2005))

[4] See Pischke&Velling (1997) for Germany, Zorlu&Hartog (2005) for the Netherlands and Norway, Dustmann et al. (2005)for the U.K. and Carrasco et al. (2008) for Spain.

[5] A noticeable exception may be found in Casarico and the Villanova (2003) who employ a theoretical model to analyze the effect of an unskilled migration shock when skill and unskilled workers are not perfect substitutes. The authors find that the unskilled migration shock modifies schooling premium and increases the incentives of natives to undertake more schooling. Thus, although in their setting migration helps to sustain social security, the arrival of migrants has strong redistributive effects.

increase in the labor/capital ratio), migration has the same effect on both skilled and unskilled workers. This is not satisfactory since migration is more likely to hit unskilled natives stronger and to increase the wage premium.

We depart from the existent literature by considering the interaction between this two effects. In order to do so, we analyze migration in a small open economy overlapping generation model (OLG) with an endogenous human capital formation technology (Ben-Porath (1969), Cunha and Heckman, (2007)). were individuals can invest in human and physical capital in the different periods of their lives. The importance of jointly modeling labor supply and human capital decisions was already stressed by Becker (1967). Furthermore, by allowing individuals to undertake human capital investments at adult stages (health investments and/or on-the job-training) they can compensate human capital depreciation when old.

This is of capital importance when one has in mind policy reforms affecting the (standard) retirement age. There is an agreement in the neuroscience literature than both health and mental training play an important role in diminishing the effects of physical and cognitive decline (Bosworth and Schaie (1997)), Adam et al. (2006), Scarmeas (2003)) or Stern (2002),(2003)). Furthermore, given that these investments may also be undertaken by the current immigrant population (even if assumed to be unskilled), a migration shock may increase the incentives to acquire human capital for the immigrant group as well. The model allows us to shed some light over a broad set of important questions concerning migration, productivity and aging and the relation among them. (a) The skill and age composition of the labor force and the evolution of the skill premium; (b) Natives' education choice and human capital investments.

Our results suggest that, as expected, a massive entry of young unskilled migrant workers initially increases the wage premium and hence also the share of educated native workers. However, if human capital investment is possible at adult stages, it is no longer true that the final wage premium has necessarily to increase, as stated by the previous literature. The total impact of unskilled migration on the wage premium (and the economy as a whole), ultimately depends on the initial average

productivity of an educated versus an non-educated worker, and not only on the fraction of educated versus non-educated workers. This result is of importance for the Policy Maker, since implies that the attitude towards migration (from a destination country viewpoint) depends on the particular country and should not be based on a general receipt. An increase of the normal retirement age leads to similar conclusions.

The remaining of the paper is organized as follows. Section 2 review some facts concerning migration towards European countries. The model is presented in section 3. Equilibrium results may be found in section 4. Section 5 concludes.

2 Some facts about EU migration

From being traditional countries of emigration, many European countries have become a destination for international migration. According to Eurostat, in 2009 around 31.9 million people in EU27 are foreign citizens, representing a 6.4 percent of total EU27 population, being 4 percent citizens of countries outside EU27 (see Table 2). Although foreign born residents represent a sizable part of total UE population, the numbers are still far from those of traditional migration countries: US, Canada and Australia have bigger shares of foreign born population (12 percent, 20 percent and 24 percent, respectively). Detailed statistics for each country may also be found in Table 2. Germany accounts for the biggest number of foreign citizenship, followed by Spain, UK and France. But Luxembourg is the country with the largest fraction of immigrants with respect to total population, although most of them are UE citizens.

Concerning the nationalities of the EU immigrants, in 2009 around 40 percent of foreign EU27 residents are citizens of another EU27 state. Considering a wider Europe (including Turkey), more than a third of immigrants come from non-UE27 countries, followed by Africa, Asia and (Latin) America.

Recent migration flow data show that Migration towards EU has decelerated in recent years, mostly as a consequence of the strong crisis hitting European countries. During 2009, about 3.0 million people immigrated into one of the EU Member States, while at least 1.9 million emigrants were reported to have left an EU Member State. UK, Spain and Italy reported the largest number of immigrants in 2009, but also the

highest number of emigrants. Although most of EU Member States reported more immigration than emigration in 2009, Ireland, Malta and the three Baltic Member States already presented negative net migration balances.

The profile of the EU immigrant is a younger and less skilled individual than the average native. Foreign citizens living in the EU27 were significantly younger than the population of nationals with median age of 34.4 years compared with the 40.4 years of age for a native. Age differences between foreign and native populations are better understood by looking at population pyramids (Fig. 3). As a consequence, immigration has slowed down population aging in European countries. Nevertheless, medium and long term projections continue to forecast a considerable aging process.

No particular effort has been done by EU countries to attract high skilled people until recent dates. In 2000, 55 percent of foreign born population in the former EU15 was estimated to have less than secondary education. The average immigrant in EU has less years of education than the EU native. As Figure 4 shows, this number contrasts with the foreign born adults in North America (U.S. and Canada) who have, on average, more years of schooling. Table 3 presents the percentage of working age population by place of birth, level of education (Low, Medium and High) and country of residence, using data from the European Labor Force Survey (LFS), as it appears in Münz (2008). As Table 3 shows, some countries are better attracting high skill immigrants than others. For example, Ireland, Denmark and Estonia have a sizable proportion of high skilled adult foreign born population. In contrast, other countries as Portugal, France, Austria or Spain had mostly attracted low skilled workers.

3 The Model

Consider a small open developed economy with free capital flows and labor inflows, there is no emigration of native population. The economy is populated by two-period overlapping generations of individuals, where population growth and survival probabilities are exogenous.[6] Each period there is an exogenous inflow of foreign 'young' individuals. All agents, foreign and native, are endowed with a unit of time

[6] We can think of young generations of wokers aged between15 and 55, and old generations aged between 55 and 95.

in each period, they don't value leisure and only care about consumption when old. During the first period of live a young native works as a low skill worker and has to decide whether she wants to become a high skill worker. If she does, a fraction of her time endowment e^H has to be allocated to education, this fraction will depend on an idiosyncratic ability/effort which follows a uniform distribution on the interval $[0, 1]$. If she becomes a high skill worker, she will offer $h > 1$ units of efficiency labor, otherwise her supply will be just 1 efficiency unit. During the first period she can also undertake health investment (or on the job training) to mitigate her human capital depreciation when old. An agent will survive to old age with probability s, during this period she will work until some fixed (legal) point in time and the rest of the period will enjoy retirement time. Young immigrants cannot get involved in education when they arrive, so they cannot work as high skill workers, but they can invest in health (job training). All children born in the receiving country are considered natives, so children of immigrants behave as natives and can become skilled workers. All markets are competitive.

3.1 Technology

The final goods production technology of the representative firm is

$$Y_t = AK_t^{\alpha} Q_t^{1-\alpha} \tag{1}$$

$$Q_t = (L_t^{\rho} + \mu H_t^{\rho})^{1/\rho} \tag{2}$$

where Y_t is output, K_t is physical capital and Q_t efficiency units of labor. L_t and H_t are low and high skill labor, respectively, both measured in units of efficiency. To work as skilled a worker needs a diploma that can be obtained during young age. The assumption of a small open economy and free capital flows implies that:

$$
\begin{aligned}
K_t &= \left(\frac{\alpha A}{r}\right)^{1/(1-\alpha)} Q_t, \\
w_t^L &= \Phi(r)\left(1+\mu x_t^{\rho}\right)^{(1-\rho)/\rho}, \\
w_t^H &= \Phi(r)\left(1+\mu x_t^{\rho}\right)^{(1-\rho)/\rho} x_t^{\rho-1}\mu,
\end{aligned}
$$

where $\Phi(r) = (1-\alpha) A \left(\frac{\alpha A}{r}\right)^{\alpha/(1-\alpha)}$ and r is the world's interest rate, w_t^i is the wage of i skill labor, and $x_t = H_t/L_t$ is the ratio of high skill labor to low skill labor. Note that the skill premium implied by this type of technology satisfies the following condition:

$$
\frac{w_t^H}{w_t^L} = x_t^{\rho-1}\mu. \tag{3}
$$

3.2 Demographics

Let N_{jt} and M_{jt} be the number of natives and immigrants of age j in period t, respectively. Each young individual gives birth to a fixed number of children at the beginning of adult age. Assuming that individuals only migrate when young, that children of immigrants become natives when young, and that there is no return to the origin country, the number of natives at the beginning of period t is

$$
N_{1t} = (1+n) N_{1t-1} + (1+m) M_{1t-1},\ t = 0,1,2,..\text{given } N_{j0},\ M_{j0} > 0,\ j = 1,2,3. \tag{4}
$$

where n and m represent the exogenous fertility rates of natives and migrants, respectively. Assuming the probability of survival from adult to old is the same for natives and migrants (this assumption plays no role in the present setup), total number of natives and immigrants in period t are respectively:

$$
\begin{aligned}
N_t &= N_{1t} + sN_{2t}, \\
M_t &= M_{1t} + sM_{2t}.
\end{aligned}
$$

Note that $M_{2t} = M_{1t-1}$ is the exogenous inflow of migrants in period $t-1$.

3.3 Households

We assume that all natives and immigrants have the same logarithmic preferences on future consumption and don't value leisure. Thus, all labor income net of taxes and transfers will finance financial assets and health investment. Retirement age is exogenous and fixed by the government, so when old an agent works a fixed fraction of time l^* and during the rest $(1-l^*)$ perceives a pension benefit and enjoys retirement. The only difference between the problem of a native and an immigrant is that the latter cannot go to school when young (arrival date) and/or that education in the origin country is not recognized.

3.3.1 Natives

In the first period a native has to decide if she goes to college, $e^i \in \left\{e^H = e, e^L = 0\right\}$. An agent has ability e to learn, which is continuously and uniformly distributed on the interval $[0,1]$. If she goes to college, she will supply $(1-e)\,h$ efficiency units of high skill labor during the first period. If not, she will supply 1 efficiency unit of low skill labor. Moreover, if she invests in health, she can influence her future human capital as follows:

$$\begin{aligned} h^i_{2t+1} &= \left(1-\delta\left(I^i_t\right)\right)h^i_{1t}, \qquad \delta\left(I^i_{t+1}\right) = \left(D+I^i_{t+1}\right)^{-1}, \quad D>1, \\ with \qquad h^i_{1t} &= h \quad if \quad i=H, \quad h^i_{1t}=1 \quad if \quad i=L. \end{aligned}$$

The budget constraints when young and old of a native agent born in period t are, respectively:

$$\begin{aligned} I^i_t + a^i_{2t+1} &= (1-\tau)\left(1-e^i\right)w^i_t h^i_{1t} + b_t \\ c^i_{2t+1} &= (1-\tau)\,l^* w^i_{t+1} h^i_{2t+1} + (1+r)\,a^i_{2t+1} + p_{t+1}\,(1-l^*) \end{aligned}$$

Given the choice of e^i, the problem of a native with skill i will be

$$\max_{I_t^i,\, c_{2t+1}^i} \; s\beta \left\{ \log c_{2t+1}^i + \log\left(1 - l^*\right) \right\}$$

$$s.t. \quad I_t^i + \frac{c_{2t+1}^i}{1+r} \;=\; \left(1-\tau\right)\left(1-e^i\right) w_t^i h_{1t}^i + b_t + \frac{\left(1-\tau\right) l^* w_{t+1}^i h_{2t+1}^i + p_{t+1}\left(1-l^*\right)}{1+r}$$

Substituting consumption into the utility function we find that the optimal amount of health investment is

$$I_t^i = \left(\frac{\left(1-\tau\right) l^* w_{t+1}^i h_{1t}^i}{1+r} \right)^{1/2} - D. \tag{5}$$

Then we can compute the lifetime income left for consumption for each case, $e^H = e$ and $e^L = 0$, and conclude that an agent will choose to go to college if and only if

$$\left(1-e^H\right) w_t^H h \geq w_t^L + \left[\frac{-l^* \left(w_{t+1}^H h - w_{t+1}^L \right)}{1+r} + 2 \frac{l^{*1/2} \left(\left(w_{t+1}^H h \right)^{1/2} - \left(w_{t+1}^L \right)^{1/2} \right)}{\left(\left(1+r\right)\left(1-\tau\right) \right)^{1/2}} \right] \tag{6}$$

The agent with effort ability e_t^* for which this condition holds with equality will determine the fraction of young native workers N_{1t} that decide to go to college, where e_t^* will be a function of current and future wages.

3.3.2 Immigrants

Immigrants are young workers at the time of their arrival. The difference between young natives and young immigrants is that the latter, independently of whether they went to college or not in their country of origin, cannot get the domestic college diploma that entitles them to work as high skill workers. Thus, the only decisions they have to take when young are those related to health investment. So (5) with $i = L$ represents also the solution to the problem of a representative immigrant agent.

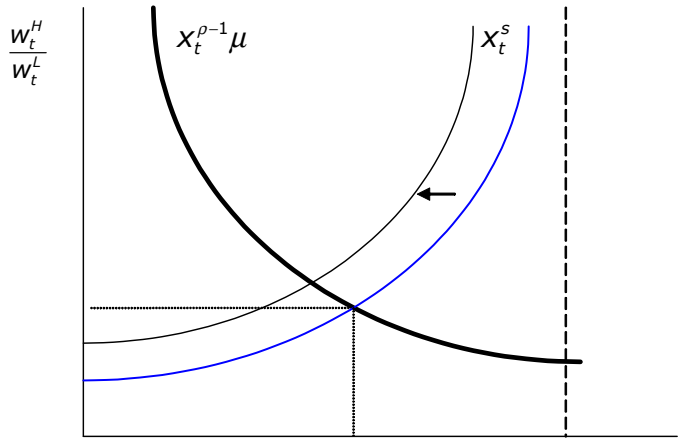


Figure 1: The labor market equilibrium

4 Equilibrium

At the beginning of each period, the stock of physical capital K_t is given. From the firms' optimally conditions, equation (3), it follows that the ratio of high skill to low skill labor can be written from the demand side as

$$\left(\frac{w_t^H}{\mu w_t^L}\right)^{1/\rho-1} = x_t^d \tag{7}$$

Moreover, solving for the demand functions of low skill and high skill workers and solving for wages it follows that

$$w_t^L = \frac{\Phi(r)}{\left[1-\mu\left(\frac{w_t^H}{\mu\Phi}\right)^{\rho/(\rho-1)}\right]^{(1-\rho)/\rho}} \equiv \varphi\left(w_t^H\right), \quad \varphi\prime\left(w_t^H\right) < 0. \tag{8}$$

Next we compute the labor supplies of each type and compute the ratio of high skill to low skill labor, both measured in efficiency units. Since we have assumed a uniform distribution for effort on the unit interval, it follows from (6) that $e_t^* N_{1t}$ will be the number of young high skill workers in period t, and $he_t^* N_{1t} \int_0^{e_t^*}(1-e)\,de$ the number of efficiency units supplied by them.

So the supply of high skill labor in efficiency units is

$$H_t^s = N_{1t}^H h \int_0^{e_t^*} (1-e)\, de + sN_{1t-1}^H l^* h_{2t}^{H*} \tag{9}$$

where N_{jt}^i is the amount of native workers of type i with age j in period t, and $N_{1t}^H = e_t^* N_{1t}$. Thus, the number of high skill workers in adult age in period t are those that went to college when young in period $t-1$, which is predetermined at period t. But h_{2t}^{H*} depends on the current wage w_t^H. This follows from (5): $h_{2t}^{H*} = \left(1 - \delta\left(I_{t-1}^{H*}\right)\right) h$, with $\delta\left(I_{t-1}^{H*}\right) = \left(\frac{(1-\tau)w_t^H l^* h}{1+r}\right)^{-1/2}$.

On the other side the supply of low skill labor measured in efficiency units is

$$L_t^s = \left(M_{1t} + sl^* M_{2t} h_{2t}^{L*}\right) + \left(1 - e_t^*\right) N_{1t} + sl^* \left(1 - e_{t-1}^*\right) N_{1t-1} h_{2t}^{L*}, \tag{10}$$

where the first term in brackets accounts for the labor supply of immigrants. Note that the efficiency units supplied when old by an immigrant and a native are the same. In the case of low skill workers (5) implies that $h_{2t}^{L*} = \left(1 - \delta\left(I_{t-1}^{L*}\right)\right)$, with $\delta\left(I_{t-1}^{L*}\right) = \left(\frac{(1-\tau)w_t^L l^*}{1+r}\right)^{-1/2}$.

Finally, dividing (9) by (10) we can obtain the ratio of high skill to low skill labor from the supply side:

$$x_t^s = \frac{\left(1 - e_t^*/2\right) e_t^{*2} N_{1t} h + sl^* e_{t-1}^* N_{1t-1} h_{2t}^{H*}}{\left(M_{1t} + sl^* M_{2t} h_{2t}^{L*}\right) + \left(1 - e_t^*\right) N_{1t} + sl^* \left(1 - e_{t-1}^*\right) N_{1t-1} h_{2t}^{L*}} \tag{11}$$

At time t the old population with high skill is given, e_{t-1}^*, so equating expressions (7) and (11), and taking into account (8) we can solve for the current wage w_t^H as a function of the future w_{t+1}^H.Thus, given the future wage, we can obtain the equilibrium values $w_t^{H^*}$ and x_t^*. Figure 1 illustrates this equilibrium point.

Suppose that initially the economy is in equilibrium and there is no migration. An inflow of immigrants will shift the schedule x_t^s in Figure 1 to the left. This will cause initially an increase in the skill premium, but it will also trigger an adjustment in the young native population going to college, e_t^* will increase and this will in turn affect the position of x_t^s. The effect of e_t^* on x_t^s is ambiguous and will depend on the initial composition of the labor force. For a relatively large x_t^* an increase in e_t^* will shift x_t^s to the right, smoothing the effect of the initial shock. But if the economy

is initially relatively abundant in low skill labor, the increase in e_t^* can decrease x_t^* further.

Increases in the legal retirement age l^* has an ambiguous effect on e_t^*. On the one hand it will increase the supply of time which increases the return from working as high skill , but on the other implies larger health investment. Moreover, increases in l^* will rise both the supplies of high skill and low skill labor and so it will have an ambiguous effect on x_t^s, which again will depend on the initial composition of the labor force. The effect of a change in the survival probability is similar to that of l^*, but it has no effect on the amount of health investment.

5 Conclusion

Migration is one of the main challenges that Europe is facing, but its effect on the economy are not well understood. For example, sometimes migration is seen as a panacea to circumvent the financial problems associated to ageing societies, sometimes as a burden, since the arrival of migrant workers can depress the wage of (non-educated) natives and reduce the average productivity of the economy as a whole. In this paper, we have focused on the effect of migration on workers' productivity and the wage gap between skill and unskilled workers.

In order to shed some light on the effect of migration on ageing receiving economies we have constructed a two period OLG model where we have made explicit both educational choices and human capital investments. Endogeneity of educational choices is of key importance since the arrival of migrant young workers is more likely to depress the wage of non-educated natives (as they are more close substitutes) and hence to increase the incentives to schooling. Also, as evidenced by the biological literature, individual life cycles are influenced by health investment and maintenance practices.

The conclusion is that the evolution of human capital during the life cycle is badly described by existent theories that treat depreciation or, for our purposes, aging as purely exogenous. Our results point out that, when human capital investment over the life cycle is possible, migration does not universally increase the wage gap. This

depends on the economy's initial conditions, and needs to be studied case by case. We do not claim that the effects we discuss are always relevant, nor that they provide the unique or even main driving forces. To address these issues additional studies featuring, for example, a detailed pay-as-you-go system and general equilibrium effects on capital accumulation are required. We leave these questions open for future research.

Table 1 Percentage of older population in EU27.

Older population

	Percentage aged 65+			Percentage aged 80+			Old age dependency ratio (%)	
	2008	2035	2060	2008	2035	2060	2008	2060
EU27	**17.1**	**25.4**	**30.0**	**4.4**	**7.9**	**12.1**	**25.4**	**53.5**
Belgium	17.0	24.2	26.5	4.7	7.4	10.2	**25.8**	**45.8**
Bulgaria	17.3	24.7	34.2	3.6	7.1	12.8	**25.0**	**63.5**
Czech Republic	14.6	24.1	33.4	3.4	7.9	13.4	20.6	61.4
Denmark	15.6	24.1	25.0	4.1	7.7	10.0	23.6	42.7
Germany	20.1	30.2	32.5	4.7	8.9	13.2	30.3	59.1
Estonia	17.2	22.8	30.7	3.6	6.8	10.7	25.2	55.6
Ireland	11.2	17.6	25.2	2.8	5.0	9.6	16.3	43.6
Greece	18.6	26.3	31.7	4.1	7.9	13.5	27.8	57.1
Spain	16.6	24.8	32.3	4.6	7.2	14.5	24.2	59.1
France[3]	16.5	24.4	25.9	5.0	8.5	10.8	25.3	45.2
Italy	20.1	28.6	32.7	5.5	9.1	14.9	30.5	59.3
Cyprus	12.4	19.0	26.2	2.8	5.3	8.6	17.7	44.5
Latvia	17.3	23.7	34.4	3.6	6.7	11.9	25.0	64.5
Lithuania	15.8	24.3	34.7	3.3	6.4	12.0	23.0	65.7
Luxembourg	14.2	21.3	23.6	3.5	5.8	8.9	20.9	39.1
Hungary	16.2	23.1	31.9	3.7	7.6	12.6	23.5	57.6
Malta	13.8	24.8	32.4	3.2	8.3	11.8	19.8	59.1
Netherlands	14.7	25.9	27.3	3.8	8.0	10.9	21.8	47.2
Austria	17.2	26.1	29.0	4.6	7.2	11.4	25.4	50.6
Poland	13.5	24.2	36.2	3.0	7.7	13.1	19.0	69.0
Portugal	17.4	24.9	30.9	4.2	7.6	12.8	25.9	54.8
Romania	14.9	22.9	35.0	2.8	6.2	13.1	21.3	65.3
Slovenia	16.1	27.4	33.4	3.5	8.4	13.9	23.0	62.2
Slovakia	12.0	23.0	36.1	2.6	6.4	13.2	16.6	68.5
Finland	16.5	26.4	27.8	4.3	9.4	10.8	24.8	49.3
Sweden	17.5	23.6	26.6	5.3	8.1	10.0	26.7	46.7
United Kingdom	16.1	21.9	24.7	4.5	6.7	9.0	24.3	42.1
Norway	14.6	22.6	25.4	4.6	7.1	10.0	22.1	43.9
Switzerland	16.4	25.2	28.0	4.7	7.7	11.1	24.1	48.5

Source: Eurostat.

Table 2 Immigration by main citizenship group, 2009

	Total foreign citizens		Citizens of another EU27 Member State		Citizens of countries outside the EU27	
	000s	% of total population	000s	% of total population	000s	% of total population
EU27*	**31 860.3**	**6.4**	**11 944.2**	**2.4**	**19 916.2**	**4.0**
Belgium**	971.4	9.1	659.4	6.2	312.0	2.9
Bulgaria	23.8	0.3	3.5	0.0	20.3	0.3
Czech Republic	407.5	3.9	145.8	1.4	261.7	2.5
Denmark	320.0	5.8	108.7	2.0	211.4	3.8
Germany	7 185.9	8.8	2 530.7	3.1	4 655.2	5.7
Estonia[3]	214.4	16.0	9.6	0.7	204.8	15.3
Ireland	504.1	11.3	364.8	8.2	139.2	3.1
Greece	929.5	8.3	161.6	1.4	767.9	6.8
Spain	5 651.0	12.3	2 274.2	5.0	3 376.8	7.4
France	3 737.5	5.8	1 302.4	2.0	2 435.2	3.8
Italy	3 891.3	6.5	1 131.8	1.9	2 759.5	4.6
Cyprus	128.2	16.1	78.2	9.8	50.0	6.3
Latvia[3]	404.0	17.9	9.4	0.4	394.6	17.5
Lithuania	41.5	1.2	2.5	0.1	39.0	1.2
Luxembourg	214.8	43.5	185.4	37.6	29.5	6.0
Hungary	186.4	1.9	109.8	1.1	76.6	0.8
Malta	18.1	4.4	8.2	2.0	9.9	2.4
Netherlands	637.1	3.9	290.4	1.8	346.7	2.1
Austria	864.4	10.3	317.0	3.8	547.4	6.6
Poland***	35.9	0.1	10.3	0.0	25.6	0.1
Portugal	443.1	4.2	84.7	0.8	358.4	3.4
Romania	31.4	0.1	6.0	0.0	25.3	0.1
Slovenia	70.6	3.5	4.2	0.2	66.4	3.3
Slovakia	52.5	1.0	32.7	0.6	19.8	0.4
Finland	142.3	2.7	51.9	1.0	90.4	1.7
Sweden	547.7	5.9	255.6	2.8	292.1	3.2
United Kingdom**	4 020.8	6.6	1 614.8	2.6	2 406.0	3.9
Iceland	24.4	7.6	19.4	6.1	5.0	1.6
Norway	302.9	6.3	165.4	3.4	137.6	2.9
Switzerland	1 669.7	21.7	1 033.6	13.4	636.1	8.3
Turkey	103.8	0.1	45.3	0.1	58.4	0.1

* Estimate
** Belgium and United Kingdom: 2008 data
*** Provisional

Source: Eurostat.

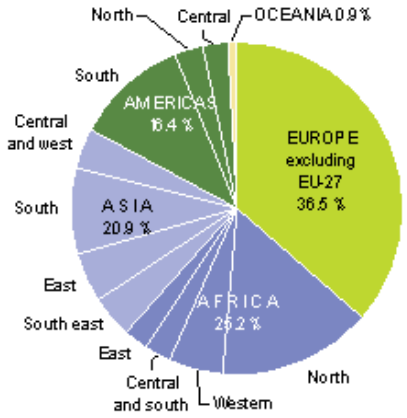
Table 3 Population aged 25-65 by place of birth, level of education and country of residence, 2005

	Born in country of residence			Born in an other EU27 country			Born in a country outside EU27		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
EU27	**28.1**	**47.6**	**24.3**	**30.7**	**41.0**	**28.3**	**36.3**	**37.9**	**25.8**
Austria	16.5	65.8	17.7	14.0	57.7	28.3	45.6	41.5	12.9
Belgium	32.7	36.2	31.1	41.8	26.5	31.7	48.3	25.4	26.3
Cyprus	33.9	40.2	26.0	25.1	31.8	43.1	38.1	29.5	32.4
Czech Republic	9.9	77.2	13.0	23.6	62.2	14.3	15.9	54.2	29.9
Denmark	17.0	50.5	32.4	(10.6)	42.2	47.2	26.4	35.7	37.8
Estonia	11.0	56.2	32.8	:	:	:	10.5	52.5	37.0
Finland	20.8	44.6	34.6	20.5	47.0	32.5	28.3	44.8	26.9
France	31.3	43.5	25.2	51.0	28.7	20.3	47.6	27.9	24.5
Germany	12.4	62.2	25.4	:	:	:	:	:	:
Greece	40.4	38.9	20.8	25.3	51.3	23.4	44.4	40.5	15.0
Hungary	24.1	59.0	16.8	16.4	60.8	22.8	11.0	57.9	31.1
Ireland	37.0	35.9	27.2	25.5	35.5	39.0	13.1	27.9	59.0
Italy	50.0	38.1	11.9	:	:	:	:	:	:
Latvia	16.7	62.4	20.9	(33.7)	43.6	:	12.1	62.6	25.3
Lithuania	13.1	60.5	26.5	:	:	:	7.7	65.3	27.0
Malta	74.7	13.7	11.5	68.2	10.9	20.9	50.4	26.1	23.5
Netherlands	28.0	40.8	31.2	14.9	51.2	33.9	33.8	44.1	22.1
Poland	15.3	68.2	16.5	38.7	47.4	(13.9)	(19.9)	58.1	22.0
Portugal	75.7	12.5	11.8	45.3	27.9	26.8	50.5	25.9	23.6
Slovakia	12.3	73.9	13.8	(15.5)	63.9	20.6	:	:	:
Slovenia	18.4	60.7	20.8	(21.8)	(60.9)	(17.3)	30.3	57.5	12.2
Spain	52.8	19.1	28.2	32.2	33.0	34.8	43.9	30.0	26.1
Sweden	15.7	55.1	29.2	16.6	50.3	33.1	23.0	46.1	30.9
United Kingdom	14.4	56.2	29.5	14.8	56.7	28.6	20.0	50.0	30.0

Notes:
[1] Incomplete EU27 average: education levels of natives do not include data for Bulgaria, Luxembourg and Romania; education levels of immigrants (born in another EU27 country or outside EU27) do not include data for Bulgaria, Germany, Italy, Luxemburg and Romania.
Data in brackets are of limited reliability due to the small sample size.

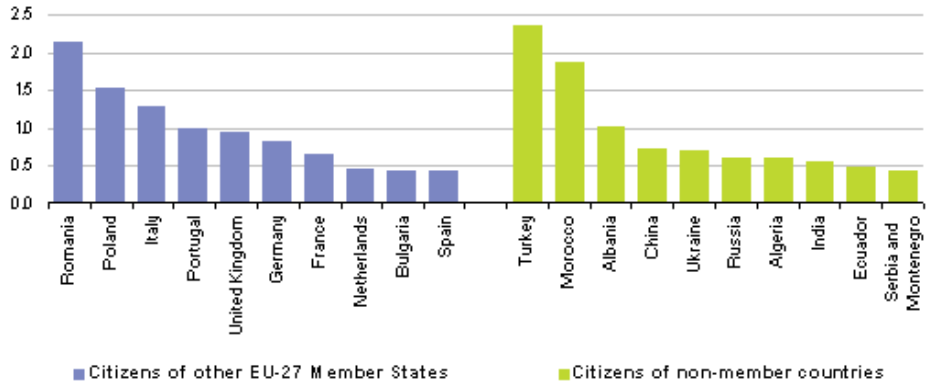
Source: European Labour Force Survey (LFS). From Münz (2008)

Fig.1 Citizens of non-member countries resident in the EU-27 by continent of origin, 2010



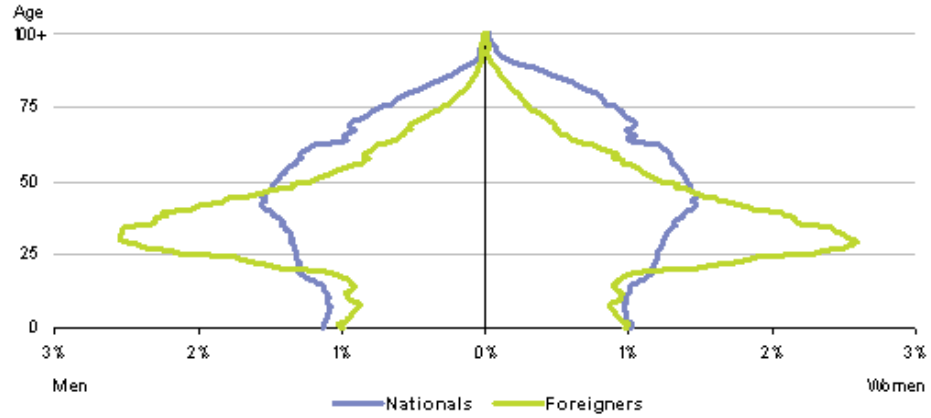
Source: Eurostat.

Fig.2 Main countries of origin of non-nationals, EU-27, 2010



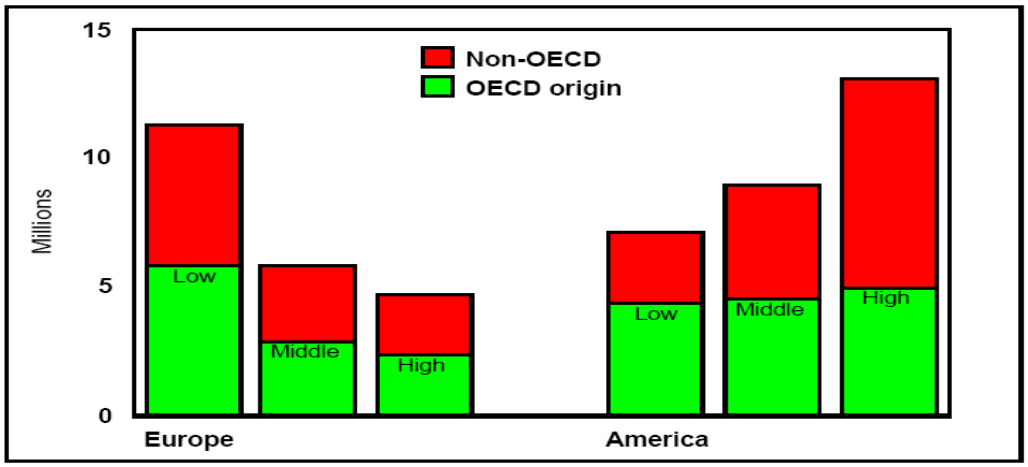
Source: Eurostat

Fig.3 Age structure of the national and non-national populations, EU, 2010



Source: Eurostat

Fig.4 Adult migrants in OECD Europe and North America, by skill level



Source: OECD database of Migrants and Expatriates. From Doquier and Marfouk (2005)